



Naturhistoriska
riksmuseet

An Open Source web-based collection management system for natural history specimens and for publishing data at GBIF

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Introduction

Presentation of The Swedish Museum of Natural History
Presentation of The DINA Collection Management System





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The Swedish Museum of Natural History

Staff : 260 persons, 6 research departments
2/3 are working in the research departments

- The units at the museum
 - [Bioinformatics and Genetics, Staff : 30 persons](#)
 - Botany
 - Geosciences
 - Zoology
 - Palaeobiology
 - Environmental research and monitoring

<http://www.nrm.se>

Collections at NRM: Total of 9 767 700 specimens*



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Botany	
- Flowering plants and Ferns	3,000,000
- Mosses, Fungi, Algae	1,500,000
Zoology	
- Vertebrates	300,000
- Invertebrates	550,000
- Entomology	2,500,000
Paleo	
- PaleoZoology	860,000
- PaleoBotany	175,000
Geology	150,000
Environmental Specimen Bank	~ 270,000 accessions

Approx. 33 Million specimens in
total from Sweden

Statistics from 2013

Bioinformatics and Genetics (BIO) , 30 persons



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Activity in our department



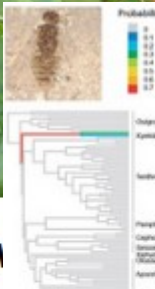
Automat Species Identific

We teach robots
insects, so that
experts with rou
identifications.



How was

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Phylog analys

The softwar
Bayesian in
evolutionary trees - phylogenies -
is widely used in medicine and
biology.



DINA web-based Collections Management System

Leading international cooperation
on the development of a new
Open Source collections
management system.



Insec in Sw

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BioAtlas Sweden / GBIF-Sweden

Biodiversity Atlas Sweden (BAS
including GBIF-Sweden)
provides data and analysis
services for Swedish and
international biodiversity and
ecosystems.



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ed species?



The DINA-Mission

The current situation [Sweden]

- Many Natural History Museums
- Stand-alone systems, '*home grown*' collection management system

Problems

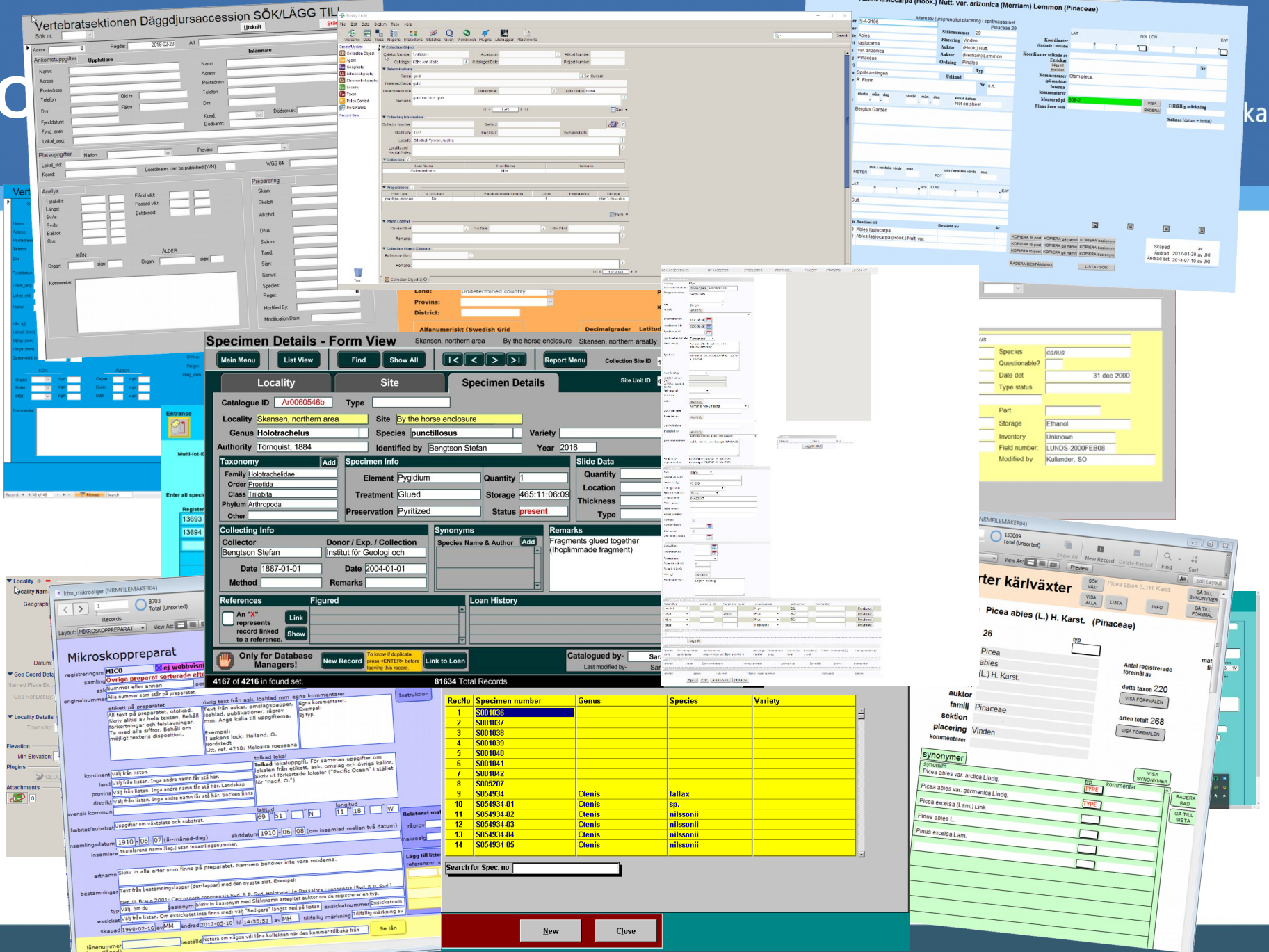
- People-centric
- Cost efficient ?
 - maintenance & operations
 - user support
- Vendor lock-in, license-cost
- Challenges when sharing data

Our Vision

- All NHM:s will use the same system
- A web-based collection management system

Solutions

- Organization-centric
- Cost efficient!
 - Centralized maintenance & operations
 - Centralized user support
- Open Source, no license-fee
- Ease of Sharing Data (e.g to GBIF)





The DINA-Vision

We are building a **platform** ...

A web-based collection management system

...for all collections...

...in the long term, replacing one system at a time

A more efficient collections management

→ No need for managing multiple systems

To open up the data to the research community and to the public!



August 2017 , Restart of the Project



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- Always been Open Source
 - Code is available at GitHub and binaries at Docker Hub
- Agile way
 - Sprint / Sprint-planning / daily standup / Sprint-review with demo / retrospect / a digital 'Kanban board'
- Change of Technology Stack , All JavaScript
- Team and the Roles.
 - 1 Project manager, 2 domain specialists , 4 developers
 - All at the same location
- MVP (Minimal Viable Product)
 - Defining the MVP
 - Concentrating on a single collection



A full JavaScript Stack



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- **Frontend core technologies**

- React & Redux
- Semantic UI
- JSON schema

- **Devops**

- Linux Servers
- Docker containers
 - "DINA"-cm, nginx, Keycloak

- **Backend core technologies**

- NodeJS
- Express
- JSON schema (standard)
- Data store

- **Data storage**

- Elasticsearch
- Postgres

Rest Conventions → JSON API



Short DEMO 1 (2)

Specimens Mammals								
<div> <div>< ></div> <div>1</div> <div>24662 Total records</div> <div>Show All</div> <div>+ New record</div> </div>		<div> <div>Q Find</div> <div>↶ ⚙</div> </div>						
Row #	Catalog number	Taxon (curatorial name)	Family	Genus	Species	Subspecies	Collectors	Type status
1	590774	Galerella sanguinea	Herpestidae	Galerella	Galerella sanguinea		HRH Prince Wilhelm	
2	590772	Myotis daubentonii	Vespertilionidae	Myotis	Myotis daubentonii			
3	558400	Physeter catodon	Physeteridae	Physeter	Physeter catodon			
4	590765						Söderström, L	
5	590764						Söderström, L	
6	590762	Nectomys squamipes	Cricetidae	Nectomys	Nectomys squami...		von Ihering, Hermann	
7	558399	Balaenoptera edeni	Balaenopteridae	Balaenoptera	Balaenoptera edeni		Johnson, CO	
8	590755	Potamochoerus porcus	Suidae	Potamochoerus	Potamochoerus po...		Waldau, Georg	
9	590752	Martes martes	Mustelidae	Martes	Martes martes			
10	590751	Pteromys volans	Sciuridae	Pteromys	Pteromys volans			
11	590750	Chironectes minimus	Didelphidae	Chironectes	Chironectes minim...		Bovallius, Carl	
12	590745						Lönnberg, Einar	
13	590741						Bergman, Sten	

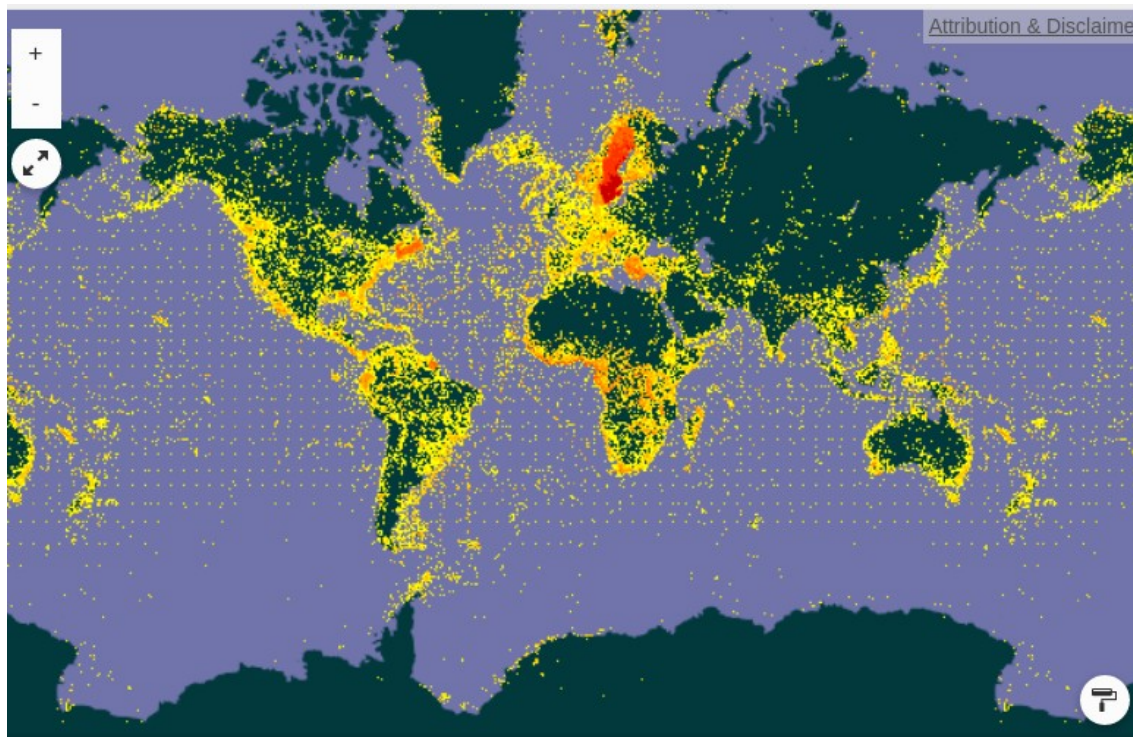


Short DEMO 2 (2)

Specimens Mammals												
< >		1	24662 Total records		Show All		+ New record		Q,Find			
Row #	Catalog number	Taxon (curatorial name)	Family	Genus	Species	Subspecies	Collectors	Type status	Start date (collecting)	End date (collecting)	Locality (collecting)	Count (collecting)
1	590774	Galerella sanguinea	Herpestidae	Galerella	Galerella sanguinea		HRH Prince Wilhelm		1914-02-07			Kenya
2	590772	Myotis daubentonii	Vespertilionidae	Myotis	Myotis daubentonii				1830-10-26		Mörkö	Swec
3	558400	Physeter catodon	Physeteridae	Physeter	Physeter catodon				1905-01-01		Färöarna	Denr
4	590765						Söderström, L		1912-05-10		Ecuador, Pichincha	Ecua
5	590764						Söderström, L		1913-04-10		Ecuador, Pichincha?	Ecua
6	590762	Nectomys squamipes	Cricetidae	Nectomys	Nectomys squami...		von Ihering, Hermann				Taquara do Mundo novo	Brazi
7	558399	Balaenoptera edeni	Balaenopteridae	Balaenoptera	Balaenoptera edeni		Johnson, CO		1929-03-10		Sydafrika	Soutl
8	590755	Potamochoerus porcus	Suidae	Potamochoerus	Potamochoerus po...		Waldau, Georg		1840-01-01			Soutl
9	590752	Martes martes	Mustelidae	Martes	Martes martes				1838-01-01		Jämtland	Swec
10	590751	Pteromys volans	Sciuridae	Pteromys	Pteromys volans						Finland, Kuopio	Finla
11	590750	Chironectes minimus	Didelphidae	Chironectes	Chironectes minim...		Bovallius, Carl				Britiska Guyana	Guya
12	590745						Lönnberg, Einar		1911-02-08		Lekiundo River, Kenya Col.	Kenya
13	590741						Bergman, Sten		1936-06-16		Ringam po, Korea	Kore
14	558398	Mesoplodon bidens	Ziphiidae	Mesoplodon	Mesoplodon bidens		Aurivillius		1885-08-06			Swec
15	590732	Mungos mungo	Herpestidae	Mungos	Mungos mungo		Wahlberg, Johan August		1839-08-23		Durban/I/	Soutl
16	590731	Mustela putorius	Mustelidae	Mustela	Mustela putorius		Swedish Museum of Natural Histor...		1914-03-27		Bara,Torup/I/	Swec
17	590729	Galerella sanguinea	Herpestidae	Galerella	Galerella sanguinea		Lönnberg, Einar		1911-03-11			Kenya
18	590721						Högfeldt, P.J.		1926-10-06		Nyborg, Håtuna	Swec
19	590720	Procapra capensis	Procapridae	Procapra	Procapra capensis		Wahlberg, Johan August		1835-04-01		Sydafrika kapkolonien, Kalk bay	Soutl
20	558397	Balaenoptera acutorostrata	Balaenopteridae	Balaenoptera	Balaenoptera acut...		Collector, anonymous		1879-01-01			Swec
21	590719	Procapra capensis	Procapridae	Procapra	Procapra capensis		Wahlberg, Johan August		1835-04-01			Soutl
22	590718						Beck-Frils, C		1907-01-05		Böringe	Swec
23	590717						Thott, Tage		1908-10-27		Skabersjö	Swec



GBIF-Sweden, 2017



Data from Sweden

- 43 occurrence datasets with 61,523,442 records.
- 1 checklist dataset with 105,768 records.
- No metadata-only datasets.
- Sweden publishes data covering 243 countries, territories and islands.

[View records shown on the map](#)

Source : <http://www.gbif.org/resource/81771>
Source : Sweden → <http://www.gbif.org/country/SE/summary> , <https://demo.gbif.org/country/SE>



GBIF Sweden (2018)

81,356,416

Published occurrences

44

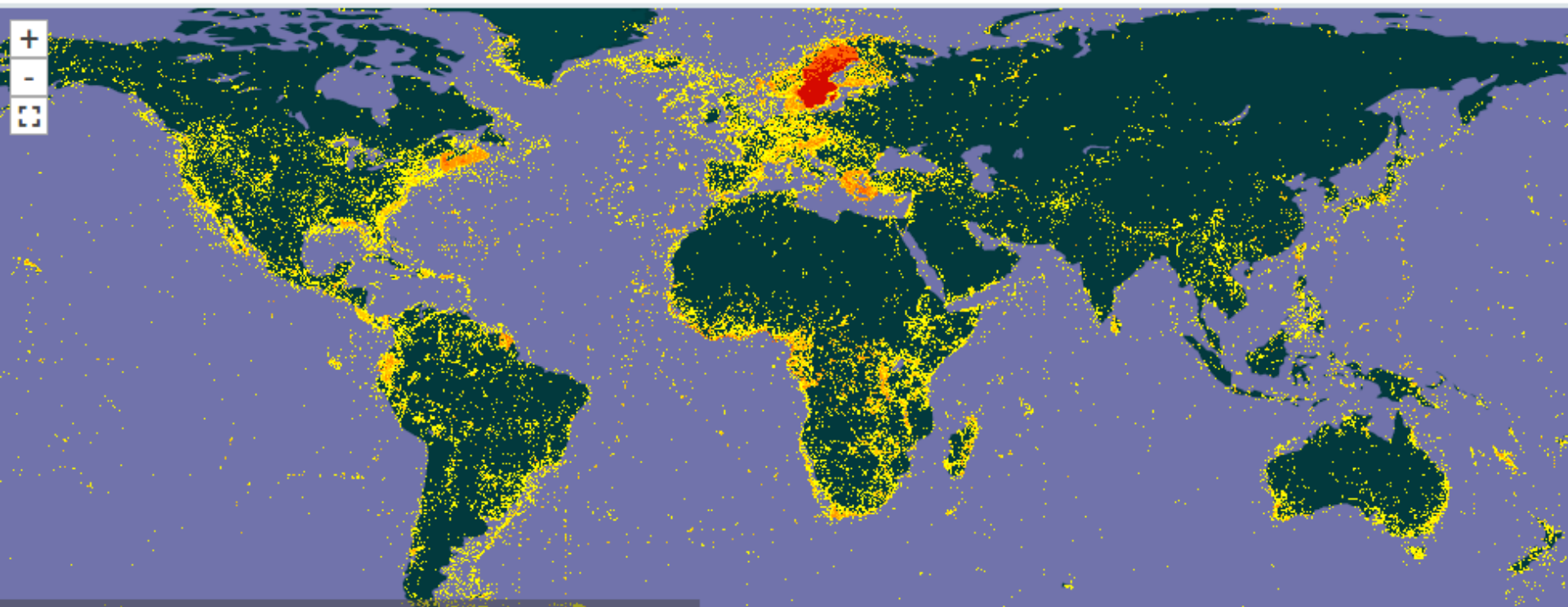
Published datasets

245

Countries and areas
covered by data from
Sweden

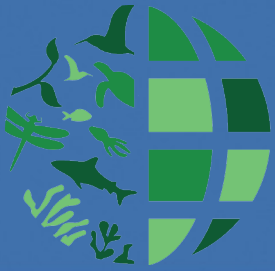
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Publishers from Sweden



Short GBIF demo, finding specimen near Baikal

- Short GBIF demo, finding specimen near Baikal from NRM



Questions

Questions